

What is claimed is:

1. A wavelength division multiplex transmission system comprising:

N/2 (N is the maximum number of wavelengths to be used) continuous wave light generating means, each for generating continuous wave light having the same wavelength as one of input even- and odd-numbered wavelengths used as operating wavelengths and outputting continuous wave light having a level twice as high as an input level of a light signal having an operating wavelength;

N/2 switching means, each for selecting one of an input wavelength and continuous wave light output from said continuous wave light generating means; and

wavelength multiplexing means for outputting the other light signal of input light signals having even- and odd-numbered wavelengths and a light signal having different wavelength which is output from said switching means upon wavelength multiplexing.

2. A system according to claim 1, further comprising control means for controlling switching operation of said switching means and level adjusting operation for continuous wave light output from said continuous wave light generating means by outputting a switching control signal and continuous wave light

7 output level adjustment control signal to said switching
8 means in accordance with an operation state of
9 wavelengths.

3. A system according to claim 2, wherein when
2 a wavelength λ_n (n is a value representing the specific
3 ordinal wavelength number in a wavelength region of the
4 1st to Nth wavelengths) and neighboring wavelength λ_{n-1}
5 are not used as operating wavelengths, said control
6 means controls said switching means corresponding to the
7 wavelength λ_n to output continuous wave light output
8 from said continuous wave light generating means for
9 generating the wavelength λ_n to said wavelength
10 multiplexing means and maintain an optical level of the
11 continuous wave light.

4. A system according to claim 3, wherein when
2 the neighboring wavelength λ_{n-1} is used as an operating
3 wavelength and the wavelength λ_n is not used as an
4 operating wavelength, said control means controls said
5 switching means corresponding to the wavelength λ_n to
6 output continuous wave light output from said continuous
7 wave light generating means for generating the
8 wavelength λ_n to said wavelength multiplexing means and
9 lower an optical level of the continuous wave light
10 output from said continuous wave generating means for
11 generating the wavelength λ_n to 1/2.

5. A system according to claim 3, wherein when
2 the neighboring wavelength λ_{n-1} and wavelength λ_n are
3 used as operating wavelengths, said control means
4 controls said switching means corresponding to the
5 wavelength λ_n to output the input operating wavelength
6 λ_n to said wavelength multiplexing section and lower an
7 optical level of continuous wave light output from said
8 continuous wave light generating means for generating
9 the wavelength λ_n to 1/2.

6. A system according to claim 1, wherein when
2 N is an odd number, said continuous wave light
3 generating means corresponding to an even integer equal
4 to $(N + 1)/2$, and the number of wavelengths is set to an
5 even number.

7. A system according to claim 6, wherein when
2 an odd-numbered wavelength λ_n (n is a value
3 representing the specific ordinal wavelength number in a
4 wavelength region of the 1st to Nth wavelengths) and an
5 even-numbered wavelength λ_{n+1} which is adjacent to the
6 wavelength λ_n with an ordinal number being incremented
7 by one are not used as operating wavelengths, said
8 control means controls said switching means
9 corresponding to the even-numbered wavelength λ_{n+1} to
10 output continuous wave light output from said continuous

11 wave light generating means corresponding to the
12 even-numbered wavelength λ_{n+1} to said wavelength
13 multiplexing means and maintain an optical level of the
14 continuous wave light output from said continuous wave
15 light generating means corresponding to the
16 even-numbered wavelength λ_{n+1} .

8. A system according to claim 7, wherein when
2 the odd-numbered wavelength λ_n is used as an operating
3 wavelength and the even-numbered wavelength λ_{n+1} which
4 is not used as an operating wavelength, said control
5 means controls said switching means corresponding to the
6 even-numbered wavelength λ_{n+1} to output the continuous
7 wave light output from said continuous wave light
8 generating means corresponding to the even-numbered
9 wavelength λ_{n+1} to said wavelength multiplexing means
10 and lower the optical level of the continuous wave light
11 output from said continuous wave light generating means
12 corresponding to the even-numbered wavelength λ_{n+1} to
13 $1/2$.